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ABSTRACT

The presentational power of television gives it unique teaching characteristics and it is a source of a wide variety of learning material that would be unavailable to learners in any other way. For instance, it can be used to: (1) demonstrate experiments or experimental situations; (2) explain principles involving movement over space and/or time; (3) provide students with case-study material; (4) archive audiovisual material; and (5) demonstrate processes. Through illustration, modelling, and supplantation, television can enhance learning by providing audiovisual images corresponding to aspects of cognitive processing. Methods of delivery include broadcasting, videocassettes, videodiscs, cable, and satellite. Some advantages of interactive videodiscs have been identified through experiences at the Open University in Great Britain and in the United States; e.g., the videodiscs can allow for individual differences, can provide excellent feedback, can be rich symbolically, and can provide an intensive learning experience. Disadvantages include high costs, the equipment needed, difficulties in programming for creative use by students, and the lack of interactive videodiscs in homes. Computer controlled videodiscs have great potential where there is a major training need or where alternatives would be costly. While television needs to be used selectively, depending on the type of course, the audience, and the skills to be developed, it can be a valuable asset for distance education, provided resources are available to do the job properly and teachers know exactly why they are using it. (MES)

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USING TELEVISION IN DISTANCE EDUCATION

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ABSTRACT

This paper argues that television has a very important role to play in distance education courses. It outlines some of the unique roles that television can play, and some of the problems in using it effectively with distance learners.

It also examines how changes in delivery technology - video cassettes, video discs, cable and satellite TV - affect its use and potential.

The paper is written to stand alone, but it draws on examples which can be found on a video-pack specially produced by the Open University/BBC-OUP called "Using Television in Distance Education", consisting of a 60-minute cassette and a text handbook. This pack is available from the author, for loan internally, or for purchase externally.

WHY USE TELEVISION?

I have been somewhat dismayed to find that on occasion my own work has been used to justify **not** using television in distance education (for instance, in a study done for the Planning Committee for the Dutch Open University - see Samson, 1983).

It is true that I have frequently identified shortcomings in students learning from television (see, for instance, Bates and Gallagher, 1977). I am also on record as saying, after an analysis of the use of broadcast television in 16 Open Universities in 1980/81, that "the use of broadcasting in open universities is either marginal or non-existent, with a few notable exceptions", and that "there are formidable difficulties in using broadcasting effectively...Given these difficulties, it is surprising that broadcasting is used at all in distance higher education" (Bates, 1984).

Quite independently, there is a growing school of thought in the U.S.A. that **pedagogical** differences **between** media are insignificant.

For instance, by aggregating and analysing a large number of laboratory controlled experiments which compared the educational effectiveness of different media, Clark (1983) found:

> "consistent evidence for the generalisation that there are no learning benefits to be gained from employing any specific medium to deliver instruction".

In Clark's view, "media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition." What matters to Clark is not the medium, but the instructional method, which within any single medium can vary enormously.

Clark is arguing that if you get the instructional approach right, in terms of clear objectives, the right level for the target group, clear structuring and segmenting of information, etc., then the choice of medium for delivering this approach becomes irrelevant in terms of instructional effectiveness.

It is true that differences between media can be easily obscured by other factors independent of media (such as the quality of instructional method). Researchers have frequently found greater differences in comprehension between for instance two television programmes than between a television programme and print (e.g. Trenaman, 1967). This would support Clark's view that factors such as instructional method are more important than media differences.

I have considerable sympathy for this point of view; nevertheless, I am more convinced than ever that television has tremendous value for distance education. In this paper, I shall try to show that television has unique teaching functions of immense significance to distance education, particularly at University level, and that new developments in technology

enable many of the difficulties and weaknesses previously associated with broadcast television to be overcome.

In support of my argument, I would like to make some general points about using media in education:

> media are generally flexible and hence interchangeable, i.e. what can be achieved educationally through one medium can usually be achieved through any other medium, given sufficient imagination, time and resources; the issue though is which medium is the most appropriate in a given circumstance; in the case of television, are there **times** when it is **clearly** the best medium to use for teaching purposes?
>
> each medium has its own aesthetic: in other words, there are right and wrong ways to use a medium so that its unique features are appropriately exploited; this means that "quality" counts - a poorly designed television programme will fail, even if television was the most appropriate medium
>
> there is no "super-medium": all media have their strengths and weaknesses, and what is a strength in one medium is often a weakness in another; this implies then that a **multi-media** approach is usually more desirable
>
> however, the greater the number of media used, the more complex the design process, and the greater the chance of redundancy and wasted expenditure; the aim therefore should be to use a limited range of media in any given context, maximising learning effectiveness at minimum cost, balanced by convenience and ease of use to both learner and teacher
>
> lastly, while for Clark **delivery** may be irrelevant pedagogically, for distance education, it is a crucial factor that **must** be considered when choosing media

I believe then that there are important differences between television and other media in the way that television represents knowledge, that these differences do have important pedagogic implications, and that delivery (and cost) factors must be taken into account when considering the possible role of television in distance education. I shall now try to provide evidence for my argument.

SOME UNIQUE EDUCATIONAL CHARACTERISTICS OF TELEVISION

It is the **presentational** power of television which in my view gives it unique teaching characteristics, in two different ways:

> it is a source of a wide variety of learning material of a kind that would be unavailable to most learners in any other way
>
> it can assist the process of learning by providing powerful audio-visual images corresponding to certain aspects of cognitive processing.

First, let us examine how television provides a unique source of learning material, and how that material can be used in teaching.

Television as a unique source of learning material

One of the major reasons for using television in distance education is that it can provide learning materials which otherwise would be impossible to provide to students working primarily at home. One way to identify such uses is to apply the criterion: "Could I do this in any other way as easily and effectively in this particular distance education system?"

I have chosen just five examples which I think would be very difficult to do without television. There are many more functions I could have chosen (see, Bates, 1984, for a full list).

1. To demonstrate experiments or experimental situations

The first example is from the Science foundation course, S101, TV22, "Falling Leaves and Beating Hearts". The presenter is Peggy Varley.

EXTRACT 1

There are several reasons why television is particularly useful for experimental work:

> many experiments just cannot be performed at home - this is obviously true of this particular example, using a live rabbit's heart;
>
> television, through enlargement, editing, and split screens, can enable students to see experimental work even more clearly than in a well-equipped university laboratory; in the example, the heart-beat could be directly related to the experimental record through the "window" in the screen;
>
> editing allows well-conducted experiments to take place, saving the student time and ensuring proper experimental results; again, this demonstration could easily go wrong;
>
> by using time more efficiently, television condenses experimental presentation: one 25 minute programme may well be equivalent to more than a whole day's lab. work in a conventional situation.

If students had no opportunity to conduct their own experiments, the presentation of "perfect" experiments would of course be misleading, so it is important to achieve a balance between home experiments, summer school work and televised experiments.

In this particular instance, once the experiment has been conducted and recorded, there is no need to repeat it, thus reducing the number of rabbits sacrificed to the experiment.

2. Principles involving movement over space and/or time

Many principles or concepts in higher education reflect changes over time or space, and not just in maths, science and technology. Because television can handle both spatial and moving images, it is particularly suitable for demonstrating or explaining such principles or ideas.

The following extract is from an Open University programme about the discovery of Netlon, the plastic netting used in gardening and for packaging.

EXTRACT 2

The idea for manufacturing Netlon is simple - once you have seen it demonstrated. Without the moving pictures and animation, though, it would be very difficult to explain, for instance, through a book.

Note also the way the process can be simplified and multiplied through the use of animation, and the use of music, together providing strong audio-visual images of the process, a point taken up later.

3. To provide students with case-study material

Television can be used to record naturally occurring events or processes, and edited to bring out the principle features of the "story" or case. This allows events occurring over a considerable time-span to be condensed into 25 minutes, while at the same time providing all students with a common case or example to work on.

The extract is from D208, "Decision-Making in Britain", TV8, "Operational Decisions", and follows the decision-making process regarding whether or not the police should provide a "bobby-on-the-beat" for a village in the North of England. The story was actually developing while filming was in progress.

The aim of this part of the course was to look at decision-making within a police organisation, and the relationship between the police and community.

Television case-study material in distance education courses can play a vital role in teaching at a higher educational level. It provides a rare opportunity for students to make their own interpretations, and to develop skills of analysis, and application of knowledge to real events.

Case-study material though needs great care in its use. There is abundant research evidence that OU students have considerable difficulty in making

good use of such material (see, for instace, Bates and Gallagher, 1977); it is easy for such programme material to seem unintegrated with the rest of the course, and hence appear irrelevant to students; course teams and producers themselves often have difficulty in suggesting how students are supposed to use such material.

With this kind of material, then, it is essential that the course team is very clear as to why this material is being provided for students.

Typical reasons might be:

to illustrate some of the general principles or ideas introduced elsewhere in the course (usually the correspondence text)

to provide students with opportunities to apply what they have learned elsewhere in the course, by analysing, explaining or identifying the phenomena contained in the case-study

to allow students to draw on their own experience to suggest solutions to problems posed in the case-studies

Any one programme of course may contain a mixture of all four goals.

It is also important that students can see how the material fits into the course. In this example, not only was the subject matter of the programme directly related to the content of the block (on Public Order), but the course team also used audio-cassettes to analyse and relate the TV programmes to the rest of the course. Indeed, for this particular programme, the course team went to the trouble on the audio-cassette to analyse the decisions they themselves had made in constructing the programme, to ensure a more systematic understanding of the reliability or otherwise of sources used in the course.

Although this is not always necessary, it does emphasise that all case-study and documentary programmes are selections of reality, a particular perspective on an issue; there is a danger of students failing to interrogate such programme material, and of just accepting it at its face value.

Most of the difficulties with case-study material can be avoided with careful planning and co-operation between academic and producer, and clear communication to students about the intended role of case-study material. If students though are expected to analyse case-study material, they will need some help and guidance, preferably in the programme itself.

4. Archive audio-visual material

There may well be a store of audio-visual material available to distance education course teams. Some broadcasting organisations have extensive archives of film and video material which can be used, at a price. A number of educational production centres, particularly in Universities, often have excellent pre-recorded material, especially in medicine, science

and education, which they may be willing to make available for secondary use, at minimal cost. Many museums and art galleries also have audio-visual archives.

In addition, the Open University/BBC partnership has generated over 3,000 television programmes. Most of the OU's material has been shot-listed and catalogued by the OU Library, so in most cases is easily located, and may be available for purchase through Open University Educational Enterprises or their foreign agents (although rights for secondary use may still need to be cleared).

It is not only film and video archives that can be used on television. Print copies of still pictures can be combined with audio-cassettes to provide very cost-effective audio-vision packages, rather than using television, but if many pictures are to be used, and detailed analysis of many individual pictures or diagrams are required, it may be more convenient for students if the material is integrated and structured into a single television programme. More probably, programmes are likely to consist of a mix of moving and still pictures.

Archive material of course is appropriate not only for history programmes. It can be useful for many subject areas, such as social sciences, education and technology, where developments or changes over an extensive period of time need to be demonstrated and compared.

Like case-study material, though, archive film rarely speaks unambiguously for itself. It has to be selected and interpreted. In the following video example, taken from an Open University course: "War and Society", the archive film is played twice: once as originally presented, then with the academic's own analysis and interpretation added.

EXTRACT 4

Also, because of the very large quantity of existing material, and the costs and effort required to find it and clear rights, it is important that course teams know precisely why they want to use archive material, and how they would expect students to use it in their studies. It is an iterative process, of course: only when certain material is seen does its potential become apparent. Indeed, the material itself may not be suitable, but viewing archive material may generate other ideas of how television could best be used - or not used!

5. To demonstrate processes

This is a deliberately broad category, covering a use in many different contexts. Television is ideal though for showing a sequence of activities that need to be carried out in a certain order, within a certain context. The order or stages of a process can often be described in print, but the actual process cannot be fully understood without seeing the whole context in which the process takes place, and the nature and quality of each individual operation required.

The example I have chosen is from an Open University Humanities course, but could equally well have come from Social Sciences (management selection),

Technology (machine assembly by robots) or Science (the procedures to be adopted when analysing amino acids), for instance.

EXTRACT 5

These then are just five examples of the way that television can bring unique learning material to students. But why is it so important to bring such material to students: what are the pedagogical advantages?

Television: content or skills?

Teaching is an iterative process, with several stages, and many different approaches. Instruction often consists of providing students with already organised and analysed learning materials, in the hope that they will learn not only the content, but the analytic process itself, from the example set by the teacher's analysis.

We shall see that television can be very helpful at this stage of **presenting** an analysis; often, though, as teachers we want students to develop their **own** skills of analysis and application of principles by providing learning situations where the analysis has not been completed, or where a variety of individual interpretations are possible.

Television is a very rich medium, in terms of its density of information and symbol systems (movement, colour, speech, sound). This richness permits television to present complex situations or material which lends itself to a variety of interpretations. Thus television is an ideal medium for helping students to develop skills of analysis and for helping them apply abstract principles and generalisations to specific instances.

A most important role then for television with distance education students is to help them to use knowledge they have acquired elsewhere in their course or studies, or from their life experiences, in **new** situations. It is therefore not so much a question in a multi-media teaching situation of using television to introduce new content, but to allow students to develop learning skills, although of course skills have to be related to appropriate content.

These skills will not develop automatically, by merely providing situations and hoping that students will somehow know how to apply what they have learned in the texts to the programme material.

As in most kinds of learning, there is a progression to be made, and guidance and feedback is necessary. Unfortunately, television is a weak medium for providing diagnosis and feedback of student learning, nor are tutors themselves generally skilled at guiding students in using television effectively. There is therefore a heavy responsibility on course teams to think through how they can help students make best use of television for developing skills.

There are several ways in which this can be done:

extensive broadcast notes can be provided, but this merely increases

the reading load;

as already mentioned, audio-cassettes can be useful in helping students make the bridge between programmes and text, but students cannot watch the TV and listen to the audio-cassette at the same time, which is sometimes necessary for purposes of analysis;

the Open University has developed a package for tutors and students, called "Learning from Television", but many students do not get the chance to work through the package, and in any case it is not usually specific enough for a particular course;

The Open University Social Sciences Foundation Course, D102, has attempted to provide a progression from didactic to open-ended programmes, with help at analysis within programmes interspersed throughout the course, and this has proved most successful. Other faculties though require different analytic skills to be developed from those covered in D102.

In the end, it is best for each course team to take responsibility itself for identifying the skills, if any, it wishes to develop through television, and to think through how students can be helped. It is also a matter of fine judgement as to when students require help, and when they should be left to their own initiative. In general, though, students get too little rather than too much help in interpreting television material.

Helping the learning process

The second unique characteristic of television is its ability to enhance the learning process by providing powerful audio-visual images corresponding to certain aspects of cognitive processing.

The main proponent of this argument is Salomon (1979), who suggests at least three ways in which television helps cognitive processing:

1. **Illustration:** television can provide powerful audio-visual images symbolising important concepts or ideas which can imprint themselves in learners' memory; Salomon (1983) states:

> "the unique attribute of illustration is that it is a private case, hopefully a typical one, of a relatively abstract class or category...it is a representation of a single case representing a general class".

This definition of course is not specific to television. Television's power though is that it can create easily recognisable images which are striking because of their richness of symbolism; a good example of this can be found in the OU's Technology Foundation course programme on cars, where where the high status given to cars in today's society is associated with images of wordhip and religion, as can be seen from extract 6.

EXTRACT 6

Salomon also adds an important warning about the dangers of illustration as

well. Here he is talking about an Open University programme, D102, TV1, on vandalism:

> "What the students see is, say, three aggressive youngsters...but do they understand that the real referent of this illustration is not the three youths, but "vandalism?...There is a fair likelihood they do not. It is quite possible that for a number of students such illustrations are misperceived as they are not seen as illustrating what they're supposed to but rather far more concrete (and somewhat irrelevant) referents...the relationship between the illustrator and the illustrated needs to be made specific."

2. Modelling: television can also provide concrete or physical models of abstract ideas. This is well illustrated by the use of a cube to physically represent the concept of $(a+b)^3$, in the next extract.

EXTRACT 7

3. Supplantation: to quote Salomon:

> "this is perhaps the most important, yet least self-evident function of TV's pictorial representation...when complex new ideas, constructs and processes are verbally introduced, students neither have appropriate corresponding images nor can they generate them on their own. TV can accomplish the critical function of explicitly providing the students with appropriate images as substitutes for the ones they would benefit from but could not generate on their own."

The next extract provides an example of supplantation, where the brackets are "exploded" to demonstrate the mental process of opening up the formula $(a+b)^6$.

EXTRACT 8

There is no doubt in my mind that television can provide unique and powerful ways in which the learning process can be assisted. For students learning at a distance, often without the variety of opportunities for learning available in conventional, campus-based teaching, the ability to provide alternative ways of approaching subject matter through the use of television is crucially important.

However, even exploiting the unique characteristics of television does not guarantee its successful use in distance education. There is not space here to elaborate on all the **conditions** that must be satisfied - for instance, the need to match the programme structure and style to the needs of different audiences; the opportunity to use television to provide links between abstract ideas and concrete images; the importance of suitable transmission times for broadcast television; and the need for students to appreciate the relevance of the television material for the rest of their studies. (For a discussion of these issues, see Bates, 1984.)

Nevertheless, there are difficulties in using **any** medium for distance education. To me, there are clearly circumstances where television has clear benefits for distance education students.

DELIVERY

The unique characteristics of television described so far apply irrespective of the method of delivery. However, recent technological developments affect delivery more than any other aspect of television, so it is important to look in more detail at different methods of delivery.

Broadcasting

Using broadcasting for distance education is by far the most effective means of reaching very large numbers; for raising awareness - if not deep understanding - of issues; for recruiting to or advertising distance education courses; for providing variety and interest in a course; and for adding to the general cultural milieu, by providing an educational alternative to other kinds of television programming.

Furthermore, because of the richness of the symbol systems of television, and hence the quantity of information to be processed in a limited, transitional period of time, broadcast television lends itself to multiple interpretations and hence a greater probability of individualised, creative thinking.

On the other hand, broadcasting is a weak **instructional** medium: it is ephemeral, and hence cannot be "captured" for review, multiple viewing for analytic purposes, or "interrogated" in detail, all of which makes full comprehension and mastery learning difficult; its continuous, "seamless" nature discourages critical, objective analysis; since all viewers must view at the same speed, it does not allow for individual differences in previous knowledge, levels of understanding, or abilities to process the material; and students are tied to watching at set times, irrespective of their progress on the course, or the convenience of the transmission slot.

This last point is particularly important, since broadcasts for distance education students, being aimed at relatively small target groups, tend to go out at times that are very inconvenient for most students.

Video-cassettes

The ability to record programmes off-air, or to play cassettes mailed through the post at home, will overcome many of the difficulties encountered with broadcast television. However, while most students in most countries can be reached through broadcast television, far fewer students have access to video recorders.

Nevertheless, access to video replay facilities is expanding rapidly. Table 1 (over) lists the percentage of homes in various countries with video-cassette recorders.

We estimate that already more OU students would watch if we sent them just video-cassettes than will watch on transmission, because of the poor quality times. One trade estimate is that at least 80% of U.K. homes will have a video-recorder within five years.

Table 1: Homes with Video-cassette recorders, 1984

Kuwait	73%
Malaysia	54%
Japan	48%
United Kingdom	40%
Australia	33%
West Germany	25%
Sweden	23%
U.S.A.	20%
Canada	15%

(Source: Screen Digest, November, 1984)

Furthermore, if we send students three-hour cassettes, which they return at the end of the course, this is cheaper than paying for national broadcast transmission for courses with less than 350 students. This saving is solely on delivery costs; for the OU, there is no saving on production costs, since BBC/Open University Productions produce cassette and broadcast material at roughly the same hourly cost. However, there is no doubt that in most cases, a non-broadcast production unit could produce high quality video-cassette material far more cheaply than a broadcasting organisation would.

Video-cassettes are stronger instructionally, are more convenient for students, are cheaper to produce, and are less costly to distribute for courses with relatively low numbers, compared with broadcasts. Their main limitation is their lack of penetration into students' homes, but even that is likely to change in many countries over the next few years.

Furthermore, the control that video replay gives to students means that programmes can be designed to encourage active responses and more analytic approaches to television, particularly where video can be used in group situations.

For instance, an Open University course aimed at in-service teachers, EM235, "Developing Mathematical Thinking", used the cassette to present situations which teachers in groups then discussed, drawing on their own experience. After the group discussion, they then worked individually at home on the texts, which gave the course team's ideas on how to tackle some of the problems shown. The next extract illustrates the use of video; note the production style and the techniques used to encourage interaction:

EXTRACT 9

Video-discs

However, while video-cassettes enable students to interact much more with television material than broadcasts do, they are still weak in providing feedback to students or diagnosing their learning weaknesses. Furthermore, searching for material is still laborious and time-consuming, and still-frame capabilities, while feasible, lead to rapid wear of tapes and recording heads. For all these, and other, reasons, many people see

video-cassettes being replaced by video-discs.

Video-discs have a number of features which are exciting distance educators:

their huge storage capacity (57,000 still frames on one side of a disc; perhaps more significantly, the possibility of storing digital data equivalent to the whole of the Encyclopedia Britannica on less than two-thirds of one side!);

superb still-frame quality, and ability to hold still-frame without any wear to the disc or laser;

ability to step through frames singly or in controlled slow or fast motion;

ability to access any single frame within two and a half seconds;

ability to add computer assisted control and computer assisted learning to still or fully moving pictures.

It is particularly this last feature which is seen as significant, in that it offers the chance of combining the instructional power of computers with the presentational power of television.

But just how relevant are computer-controlled video-discs to distance education? As a result of our experience at the Open University, and from a number of other video-disc projects in Britain and the U.S.A., it is now possible to identify some of the advantages and disadvantages of inter-active video.

Some of the **advantages** are:

well-designed discs permit students to work through the material in a variety of ways, allowing for individual differences;

computer control enables students to receive excellent feedback and interaction, and can be highly motivating;

interactive video is rich symbolically, incorporating still or full moving pictures, a wide variety of graphics and animation, clear text combined with pictures, and two independent sound tracks;

it provides an intensive learning experience; one interactive video-disc can involve each student in at least three hours of intensive study.

Some of the **disadvantages** are:

designing an interactive video disc from scratch involves very high production costs; an average figure (at total costs, including overheads) is around US$125,000 (£90,000);

a single study workstation for an interactive Laservision disc can cost up to US$4,000 (£3,000); certainly too much to expect a student to provide;

each interactive video disc requires the correct combination of hardware (disc player, brand micro, interface and monitor) to work; there is as yet no standardised system;

producing fully interactive video-discs which exploit to the full the potential of the medium requires a very complex production procedure, involving advanced and detailed planning and team work from a number of different professions; not all institutions are capable of providing the framework which such a production process requires;

to date, the range and level of interaction via a micro-computer has been rather restricted to the "show, test and help" model following the old programmed learning approach, but with better visuals; it is proving more difficult to programme in such a way that students can explore in a more creative and open-ended way (but with guidance) the large data-base that such a system can offer; there is also a lack of good indexing and "help" routines, which should be standard components of any interactive video computer programme.

from the point of view of distance education, the **main** disadvantage of interactive video-discs though is that they are not home-based, nor will they be in the foreseeable future (although, as at the Dutch Open University, it does make sense to use discs rather than cassettes for a system where students go to study centres to view); conversely, video-discs are more suitable for use in conventional teaching establishments, but only when the alternative to video-disc would be very expensive or impossible by other means.

It is now clear that computer-controlled videodiscs have great potential where there is a major training need, or where alternatives (such as building expensive simulators) would be very costly. It is less clear that they will ever be viable for distance higher education, although at this stage their full potential has still to be explored.

However, it is important to make a distinction between computer-controlled and stand-alone video discs. While I have outlined a formidable list of reservations about computer controlled videodiscs for distance education, these reservations do not necessarily apply to stand-alone videodiscs.

A good example of a stand-alone videodisc is that on cell biology produced by the Institüt für den Wissenschaftlichen Film (Institute for Scientific Film) in Göttingen, in West Germany. The Institute has taken film from its extensive archive and transferred it to videodisc. The disc is accompanied by a detailed printed handbook, which provides a full index of each example.

The provision of a resource disc such as this has a number of advantages. Firstly, students with the remote control handset can explore the disc as

they wish. They are not locked into a routine laid down by a computer programme. A teacher or student can choose their own route through the materials. The teacher can use the disc in a group situation, selecting exactly what is required from the disc, thus cutting down on the need for expensive work stations. On the other hand, the teacher can provide guidance for students on ways to use the disc. This can be done either by the teacher providing written support material, or by the teacher writing his or her own computer programme to control the disc. Eventually, when several computer programmes have been written in this way, other teachers will be able to buy these as well as the video-disc itself.

The main advantage though of designing stand-alone rather than computer controlled interactive videodiscs is that stand alone discs are much cheaper to produce, by merely transferring or editing existing film and video material to disc, and where appropriate by clearing rights. This method of producing discs would rapidly increase the supply of courseware at a low cost to users, thus encouraging educational users to buy disc machines.

However, as far as distance education is concerned, this is all dependent on the penetration of video-discs into the home market. Clearly, that is still many years away, although I suspect they will be used increasingly in situations where tutors and students can get together, such as summer or day schools.

Cable and Satellite

While cable and satellite are less likely than video-disc to change the nature of teaching and learning, they are likely to be more directly relevant to distance education over the next ten years or so.

Pedagogically, cable and satellite share many of the characteristics of broadcast television. Satellite offers the possibility of linking students over far greater distances than terrestrial broadcasting; cable offers the possibility of local transmission to specifically targeted audiences; both suggest the possibility of more channels, and hence more time on television for educational purposes.

As far as distance education is concerned, cable and satellite have led to the development of live, interactive programming. For instance, Michael Catchpole, based at Port Alberni, a relatively isolated area of British Columbia in Canada, has used the cable and satellite facilities of Knowledge Network to run courses in introductory psychology for students throughout the province. Students can call in live (by telephone) with their questions, which are answered by Michael Catchpole on-air.

This of course could be done with terrestrial broadcasting, but the geography of the province requires satellite coverage, and the extra capacity provided by local cable stations, linked to the satellite system, allows for more time to deal with questions.

Clearly, satellite distribution could be of great value for distance education, where there are vast distances to be covered by a single course. Cable provides a means by which conventional, campus-based institutions

can spread their teaching beyond their walls, and perhaps more importantly, recruit a wider variety of students.

However, there are three fundamental questions that distance teaching institutions need to ask about any system of distribution, but particularly cable and satellite, especially if using commercially-based systems:

> who will pay for transmission, and what will be the transmission costs?
>
> for how long can we rely on the system of distribution?
>
> who is going to pay for production, and what will be the costs of production?

How is the distribution of materials to be financed? At a rough estimate, the "real-cost" of providing a single, direct broadcast satellite television channel seems to be somewhere around £1-2 million a year. At around £250-£500 an hour, for 100 hours a week, the cost does not seem too high; but for education to get such "marginal" rates requires that all remaining capacity is fully used and properly financed every week of the year. That requires an awful lot of traffic. Alternatively, it requires government regulation to ensure that educational materials are carried at these rates.

Most educational uses of satellite have either been short-term pilots, to test the technology (e.g. the first Indian SITE project) or have been heavily subsidised by central or local government (e.g. Knowledge Network in Canada). Providing a regular service via satellite or cable requires substantial funding, to cover both distribution and production costs.

Secondly, making programmes that exploit the unique pedagogic characteristics of television costs money. If cable or satellite is to be used solely for relaying lectures, there are far cheaper and more effective methods of doing this (for instance, duplicated lecture notes or audio-cassettes sent through the post, or radio). Furthermore, the greater the transmission time available, the greater the number of programmes that are needed. It is no good having a distribution system without the programmes to fill it.

This is not to argue that satellite and cable will have no value for distance education; however, they are not the low-cost panacea that some politicians are seeking, and distance education systems need to think very carefully about the best way to exploit these opportunities. The danger is that money will come from external sources for short-term projects, but the more permanent funding required for proper and continuous educational provision through cable or satellite will be too big an egg to swallow.

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HORSES FOR COURSES

Those of you that follow the sport of kings will know that a good steeplechaser will rarely do well on the flat, and vice versa. Similarly, television needs to be used selectively, depending on the type of course,

and above all on the target audience and the skills to be developed.

Television can be a most valuable asset for distance education, provided that resources are available to do the job properly, and those teaching the course know exactly why they are using television. Distance education courses can certainly manage without television, but in my view most will suffer a loss in quality without it.

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